For term 4 we will be spending some time on Fractions that may have been rushed after lockdown, then we will move onto algebraic thinking. With the last couple of weeks doing catchup (or Christmas Decoration based maths)

Fractions, Proportions and Ratios

https://nzmaths.co.nz/planning-sheets

Youtube videos

Youtube songs

DMIC Tasks

NZ Maths Tasks

Number strategies

NA3-1: Use a range of additive and simple multiplicative strategies with whole numbers, fractions, decimals, and percentages.

This means students will use a range of mental strategies based on partitioning and combining to solve addition and subtraction problems with multi-digit whole numbers and simple decimals (tenths). These strategies include standard place value, for example 603 – 384 = ☐ as 60 – 38 tens less one (219), rounding and compensating, for example 923 – 587 = ☐ as 923 – 600 + 13 = ☐, and reversing (applying inverse), for example 923 – 587 = ☐ as 587 + ☐ = 923. Students should also connect known multiplication facts to solve multiplication and division problems, for example 13 x 6 = ☐ as 10 x 6 + 3 x 6 = ☐ (distributive property), 14 x 9 = ☐ as 2 x (7 x 9) = ☐ (associative property) and 36 ÷ 9 = ☐ using 4 x 9 = 36 (inverse). This multiplicative understanding allows students at Level Three to find fractions of quantities, for example two-thirds of 24 as 24 ÷ 3 x 2 = 16, find simple equivalent fractions related to doubling and halving, for example 3/4 = 6/8 , to add and subtract fractions with the same denominators, for example 3/4 + 3/4 = 6/4 = 1 2/4, and to convert improper fractions to mixed numbers, for example 17/3 = 5 2/3. Students should know the decimals and percentage conversions of simple fractions (halves, quarters, fifths, tenths) and use these to solve simple percentage of amount problems, for example 50% is fifty out of one hundred. 50% is one half so 50% of 18 is 9 or five is half of ten. Level Three corresponds to the Advanced Additive stage of the number framework. Supporting teaching resources.

NA3-5: Know fractions and percentages in everyday use.

This means students will understand the meaning of the digits in a fraction, how the fraction can be written in numerals and words, or said, and the relative order and size of fractions with common denominators (bottom numbers) or common numerators (top numbers). Fundamental concepts are that fractions are iterations (repeats) of a unit fraction, for example 3/5 = 1/5 + 1/5 + 1/5 and 5/3 = 1/3 + 1/3 + 1/3 + 1/3 + 1/3. This means the numerator (top number) is a count and the denominator tells the size of the parts, for example in 5/3 there are five parts. The parts are thirds created by splitting one into three equal parts. This means that fractions can be greater than one, for example 4/3 = 1 1/3, and that fractions have a counting order if the denominators are the same, for example 1/3, 2/3, 3/3, 4/3,... The size of the denominator also affects the size of the parts being counted in a fraction. For example, thirds of the same whole are smaller than halves of the same whole. So fractions with common numerators have an order of size based on the size of the parts, for example 2/7 < 2/5 < 2/3 (< means "less than"). Students at Level Three should know simple common fraction-percentage relationships, including 1/2 = 50%, 1/4 = 25%, 1/10 = 10%, 1/5 = 20%, and use this knowledge to work out non-unit fractions as percentages, for example 3/4 = 75%. Supporting teaching resources.

Stage1-3

Achievement objectives Level 1

Number Strategies AO1: Use a range of counting, grouping, and equal-sharing strategies with whole numbers and fractions

Key Numeracy ideas

Find by practical means halves and quarters of shapes and objects e.g. half a glass of water

Find halves and quarters of sets of objects to 20 by equal sharing of objects

Knowledge being developed:

Developing common vocabulary for fractions, particularly halves and quarters. Extending this to eighths, sixteenths to develop understanding of '-ths'.

Stage 3-4

Achievement objectives Level 1/2

Level One

Number Strategies AO1: Use a range of counting, grouping, and equal-sharing strategies with whole numbers and fractions

Level Two

Number Knowledge AO2: Know the basic addition and subtraction facts

Key Numeracy ideas

Find simple fractions of shapes and lengths starting with halves and quarters, then moving to thirds, fifths and tenths

Find a fraction of a number by sharing out the objects equally, moving towards anticipating the sharing by imaging or skip-counting. Emphasis on halves, quarters, eighths, thirds and fifths.

Knowledge being developed:

Identify the symbols for halves, quarters, thirds, and fifth

Recall the doubles to 20, e.g. 7 + 7 = 14..

Stage 4-5

Achievement objectives Level 2

Number Strategies AO1: Use simple additive strategies with whole numbers and fractions.

Number Knowledge AO4: Know simple fractions in everyday use

Key Numeracy ideas

Find a unit fraction of a set using addition facts, particularly doubles, e.g. 1/4 of 16 is 4 using 1/2 of 16 is 8.

Find unit fractions of a continuous region, like a length or area, using halving.

Order unit fractions and fractions with the same denominator and explain why they are larger or smaller

Order fractions visually using materials, including improper fractions like 5/3 and 7/4, and explain what the numerator and denominator mean.

Number Knowledge being developed:

Identify the symbols for halves, quarters, thirds, fifths, and tenths including fractions greater than 1.

Order fractions with like denominators, e.g. 1/4. and 2/4..

Stage 5-6

Achievement objectives Level 3/4

Level 3

Number Strategies AO1: Use a range of additive and simple multiplicative strategies with whole numbers, fractions, decimals, & percentages. Number Knowledge AO3: Know how many tenths, tens, hundreds, and thousands are in whole numbers.

Number Knowledge AO4: Know fractions and percentages in everyday use.

Level 4

Number Knowledge AO6: Know the relative size and place value structure of positive & negative integers & decimals to three decimal places.

Key Numeracy Strategy ideas

Find fractions of a set using multiplication and division, e.g. 1/3 of 21 is 7 (1/3 × 21 = 7)

Use symmetry to find fractions of continuous shapes like lengths, circles, and rectangles.

Solve division problems that have fraction answers using halving.

Create equivalent ratios by repeated copying.

Measure how many times a unit fraction goes into a whole number, e.g. How many quarters are in five? (5 ÷ 1/4 = 20)

Rename improper fractions as mixed numbers using materials with multiplication, and position improper fractions on a number line.

Number Knowledge being developed:

Identify symbols for any fraction, including tenths, hundredths, thousandths, and those greater than 1

Say the forwards and backwards word sequences for halves, quarters, thirds, fifths, and tenths

Say the decimal number word sequences, forwards and backwards, in tenths and hundredths

Order unit fractions for halves, quarters, thirds, fifths, and tenths

Recall the number of tenths and hundredths in decimals to two places

Round decimals with up to two places to the nearest whole number

Stage 6-7

Achievement objectives Level 4/5

Level 4
Number strategies and knowledge AO2: Understand addition and subtraction of fractions, decimals, and integers.
Number strategies and knowledge AO3: Find fractions, decimals, and percentages of amounts expressed as whole numbers, simple fractions, and decimals
Number strategies and knowledge AO4 Apply simple linear proportions, including ordering fractions.
Number strategies and knowledge AO5 Know the equivalent decimal and percentage forms for everyday fractions.
Number strategies and knowledge AO6 Know the relative size and place value structure of positive and negative integers and decimals to three places.
Level 5
Number strategies and knowledge AO3: Understand operations on fractions, decimals, percentages, and integers.

Key Numeracy Strategy ideas Multiplication/Division
Find equivalent fractions by splitting, e.g. 3/4 = 15/20 , by splitting each quarter into fifths.
Order fractions using equivalence and benchmarks, e.g. 2/5 < 7/16 because 2/5 is 1/10 less than 1/2 and 7/16 is 1/16 less.
Find fractions of lengths, areas, volumes and other continuous quantities using reunitising, e.g. three quarters of one half is three eighths
Find fractions of whole number amounts using multiplication and division, e.g. 2/3 of 36 = (⅔ x 36).
Multiply fractions by other fractions,e.g.⅔ x ¾ = 6/12 = 1/2
Rename improper fractions as mixed numbers using division, and position improper fractions on a number line.
Solve division problems that have fraction answers, e.g. 8 ÷3 = 2 2/3 , and connect division with the numerator and denominator of the answer, e.g. 4 ÷ 5 = 4/5 .
Convert fractions to decimals, and percentages and vice versa.
Estimate and find percentages of whole number amounts using benchmark percentages, e.g. 65% of $80 as 50% is $40, 10% is $8, 5% is $4, so $40 + $8 + $4 = $52
Add and subtract fractions with related denominators, e.g. 3/4 + 5/12 = 12/14 = 1 2/12
Add and subtract decimals.
Solve measurement problems with related fractions, by recognising equivalent fractions, e.g. How many sixths are in one and one half? (1 ½ ÷1/6 =9/6 ÷ 1/6 = 9).
Show the order of decimal numbers by developing a number line scale
Solve simple rate problems using multiplication, e.g. Picking 7 boxes of apples in 1/2 hour is equivalent to 21 boxes in 1 1/2 hours.
Find equivalent ratios using multiplication and division and express them as equivalent fractions, e.g. 16:8 as 8:4 as 4:2 as 2:1 and 16/24 = 8/12 = 4/6 = 2/3
Number Knowledge being developed:
Order decimals to three places, for examples, 6.25 and 6.3
Order fractions, including halves, quarters, thirds, fifths, and tenths
Record the results of mental calculations using equations and diagrams, for example, empty number line
Recall fraction decimal percentage conversions for halves, thirds, quarters, fifths, and tenths
Recall equivalent fractions for halves, thirds, quarters, fifths, and tenths with numbers to 100 and with 1 000
Round whole numbers and decimals with up to two places to the nearest whole number or tenth

Big Maths Ideas that fit with Fractions, Proportions and Ratios
Big idea 1,2, 3, 4, 5, 7, 8, 11,

https://nzmaths.co.nz/planning-sheets

Algebra Week 1-6

https://nzmaths.co.nz/planning-sheets

There are no planning sheets from the numeracy project related to Algebra for levels 1 and 2. These are pre planned units relating to patterns and relationships and also for equations and expressions on NZ Maths for these levels.

Achievement objectives Level 1

Equations and expressions
Communicate and explain counting, grouping, and equal-sharing strategies, using words, numbers, and pictures.
Patterns and relationship
Generalise that the next counting number gives the result of adding one object to a set and that counting the number of objects in a set tells how many.
Create and continue sequential patterns.

Achievement objectives Level 2
Equations and expressions
Communicate and interpret simple additive strategies, using words, diagrams (pictures), and symbols.
Patterns and relationships
Generalise that whole numbers can be partitioned in many ways. • Find rules for the next member in a sequential pattern.

Stage 5-6

Achievement objectives Level 3
Patterns and Relationships AO2: Connect members of sequential patterns with their ordinal position and use tables, graphs, and diagrams to find relationships between successive elements of number and spatial patterns.
Equations and Expressions AO1: Record and interpret additive and simple multiplicative strategies, using words, diagrams, and symbols, with an understanding of equality.

Key Numeracy ideas
Find relationships in repeating and sequential patterns and represent the relationships using additive and simple multiplicative rules, e.g. In the sequence 3, 7, 11, 15, …, the tenth number can be found by 3 + 4 + 4 + 4 + 4 + 4 + 4 + 4 + 4 + 4 = 39
Find relationships in patterns and ordered pairs, and describe the relationships using word rules, tables, and graphs.
Use a rule to create a pattern.
Interpret relationships shown in equations using the properties of operations and understanding of the equals sign.

Stage 6-7

Achievement objectives Level 4/5
Level 4
Patterns and Relationships AO2: Use graphs, tables, and rules to describe linear relationships found in number and spatial patterns.

Equations and Expressions AO1 Form and solve simple linear equations.
Level 5
Number Strategies and Knowledge AO2: Use prime numbers, common factors and multiples, and powers [including square roots].

Key Numeracy ideas
Find relationships in repeating and sequential patterns and represent the relationships using additive and multiplicative rules, e.g. In the sequence 3, 7, 11, 15, …, the tenth number is 10 4 – 1 = 39.
Interpret and identify relationships in tables and graphs.
Model situations with equations, and expressions, and find missing unknowns in the equations.
Find out whether a number is prime or non-prime, and use primes to find the factors of a number.
Find relationships and patterns in powers and square roots.

Stage 7-8

Achievement objectives Level 5
Number Strategies and Knowledge AO2: Use prime numbers, common factors and multiples, and powers [including square roots]. Number Strategies and Knowledge AO3: Understand operations on fractions, decimals, percentages, and integers.
Patterns and Relationships AO2: Relate tables, graphs and equations to linear and simple quadratic relationships found in number and spatial patterns.

Key Numeracy ideas
Find general rules for finding any member of a repeating, sequential pattern, and record the rule algebraically, e.g. In the sequence 5, 8, 11, 14, 17,… the nth number is given by 3n + 2. Solving 101 = 3n + 2 will tell what term in the sequence is 101.
Use a variety of approaches, including making tables (spreadsheets), creating graphs, and solving equations, to find unknowns from a pattern or relationship.
Solve problems by finding the prime factors of numbers.
Solve problems that involve exponents and square roots.
Find factorials and use factorials to solve problems, e.g. 4! = 1 × 2 × 3 × 4

The main ‘Big Ideas’ that appear to relate to Algebra (others will fit as well)

BIG IDEA #3 EQUIVALENCE: Any number, measure, numerical expression, algebraic expression, or equation can be represented in an infinite number of ways that have the same value. ***Algebraic Expressions and Equations***

• Algebraic expressions can be named in an infinite number of different but equivalent ways (e.g., 2(x – 12) = 2x – 24 = 2x – (28 - 4)).

• A given equation can be represented in an infinite number of different ways that have the same solution (e.g., 3x – 5 = 16 and 3x = 21 are equivalent equations; they have the same solution, 7).

BIG IDEA #4 COMPARISON: Numbers, expressions, and measures can be compared by their relative values.

• Numerical and algebraic expressions can be compared using greater than, less than, or equal.

BIG IDEA #10 VARIABLE: Mathematical situations and structures can be translated and represented abstractly using variables, expressions, and equations.

Examples of Mathematical Understandings:

• Letters are used in mathematics to represent generalized properties, unknowns in equations, and relationships between quantities.

• Some mathematical phrases can be represented as algebraic expressions (e.g. Five less than a number can be written as n – 5.)

• Some problem situations can be represented as algebraic expressions (e.g. Susan is twice as tall as Tom; If T = Tom's height, then 2T = Susan's height.)

• Algebraic expressions can be used to generalize some transformations of objects in the plane.

BIG IDEA #12 RELATIONS & FUNCTIONS: Mathematical rules (relations) can be used to assign members of one set to members of another set. A special rule (function) assigns each member of one set to a unique member of the other set.

Examples of Mathematical Understandings:

• Mathematical relationships can be represented and analyzed using words, tables, graphs, and equations.

• In mathematical relationships, the value for one quantity depends on the value of the other quantity.

• The nature of the quantities in a relationship determines what values of the input and output quantities are reasonable.

• The graph of a relationship can be analyzed with regard to the change in one quantity relative to the change in the other quantity.

The graph of a relation can be analyzed to determine if the relation is a function.

• In a linear function of the form y = ax, a is the constant of variation and it represents the rate of change of y with respect to x.

• The solutions to a linear function form a straight line when graphed.

• A horizontal line has a slope of 0, and a vertical line does not have a slope.

• The parameters in an equation representing a function affect the graph of the function in predictable ways.

BIG IDEA #13 EQUATIONS & INEQUALITIES: Rules of arithmetic and algebra can be used together with notions of equivalence to transform equations and inequalities so solutions can be found.

Examples of Mathematical Understandings:

• A solution to an equation is a value of the unknown or unknowns that makes the equation true.

• Properties of equality and reversible operations can be used to generate equivalent equations and find solutions.

• Techniques for solving equations start by transforming the equation into an equivalent one.

• A solution or solutions to a linear or quadratic equation can be found in the table of ordered pairs or from the graph of the related function.

• Techniques for solving equations can be applied to solving inequalities, but the direction of the inequality sign needs to

Possible Questions Fractions:

At _____'s birthday there were 24 presents. ____ opened ⅓ of them and _____ opened ⅛ of them. How many presents did ____ open? How many did _____ open? How many are still to be opened?

During the holidays ____ did some baking. She made 48 cookies for her family. Her Mum ate ¼ of them. ____ ate ⅛ of them. How many did they each eat? How many cookies were left for the other people in her family?

Link to DMIC questions

Fraction Groups

IMMERSION ACTIVITIES Youtube videos Youtube songs Word bank - preload vocabulary		
MATHEMATICS VOCABULARY • Half, quarter, thirds, fourths… numerator, denominator, order, divide, groups, split, cut, share, equal, parts, total, pieces, decimal, percentage		
WEEK TWO: Know fractions and percentages in everyday use	**IMMERSION ACTIVITIES** Youtube song Youtube video 1 Youtube video 2	**Monday/Tuesday** Immersion activities Watch powerpoints

	Word bank - preload vocabulary Powerpoints Work through fractions sheet matching fractions **MATHEMATICS VOCABULARY** Half, quarter, thirds, fourths… numerator, denominator, order, divide, groups, split, cut, share, equal, parts, total, pieces, decimal, percentage **ACTIVITY ONE:** Split class into 2 groups - Group on mat - in pairs share 3 brownies between the 2 of them (with strips of paper) Write on the strips of paper showing the fraction. Independent group do page 161 and 162 (Finding fractions of regions) NZC Mathematics Stage 5 Early Additive Book.	Make a word collage using the vocabulary we have already discussed **Thursday** Finish immersion activities Watch powerpoints **Friday** Activity 1
	INDEPENDENT ACTIVITIES NZC Mathematics Stage 4 Advanced Counting Book NZC Mathematics Stage 5 Early Additive Book NZC Mathematics Stage 6 Advanced Additive Book Pearson Mathematics Level 2a book or Stage 2-3 Cards (Laiseni and Scarlett)	
WEEK FOUR: Youtube clips - ordering fractions Order unit fractions and fractions with the same denominator and explain why they are larger or smaller Know fractions and percentages in everyday use Recall equivalent fractions for halves, thirds, quarters, fifths,	**Whole Class Warm Up:** Plan Print Have a folded piece of paper and show equal sharing representing a fraction. Yavnit and his family are making barfi for Diwali. They make a tray with 12 pieces to share with four families. How many would each family get? What fraction of barfi is this?	**Monday/Tuesday** Activity 1 DMIC Plan Watch powerpoints **Wednesday/ Thursday** Whole Class Warm Up Equivalent Fractions

and tenths with numbers to 100 and with 1 000	 **ACTIVITY ONE:** Ordering fractions activity - DMIC Plan **ACTIVITY TWO:** Ordering fractions activity - DMIC Plan	Activity 2 DMIC Plan Whole Class Warm Up DMIC Mentoring Thursday 10.15-11.15 Thursday afternoon DMIC task - due in
	INDEPENDENT ACTIVITIES Equivalent Fractions Sheets Ordering fractions sheet/cards E-asTTle tests	
WEEK FIVE: Order unit fractions and fractions with the same denominator and explain why they are larger or smaller Know fractions and percentages in everyday use Recall equivalent fractions for halves, thirds, quarters, fifths, and tenths with numbers to 100 and with 1 000	**Whole Class Warm Up:** Plan Print **Testing Week - use plans next week if no time to complete** **ACTIVITY ONE:** Presents question - DMIC Plan **ACTIVITY TWO:** Cookies question - DMIC Plan	**Monday/Tuesday** Warm up - whole class Activity 1 DMIC Plan **Wednesday/ Thursday** Warm up - whole class Activity 2 DMIC Plan
	INDEPENDENT ACTIVITIES Working through books NZC Mathematics Stage 4 Advanced Counting Book NZC Mathematics Stage 5 Early Additive Book NZC Mathematics Stage 6 Advanced Additive Book	

	Pearson Mathematics Level 2a book or Stage 2-3 Cards (Laiseni and Scarlett)	
WEEK SIX:	**ACTIVITY ONE:** **ACTIVITY TWO:**	**Monday/Tuesday** Warm up **Wednesday/ Thursday**
	INDEPENDENT ACTIVITIES	
WEEK SEVEN:	**ACTIVITY ONE:** **ACTIVITY TWO:** **ACTIVITY THREE:**	**Monday/Tuesday** **Wednesday/ Thursday**
	INDEPENDENT ACTIVITIES	